

**UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

ECOFACITOR, INC.

Plaintiff,

v.

ECOBEE, INC.,

Defendant.

Case No. 6:21-cv-00428-ADA

JURY TRIAL DEMANDED

Expert Declaration of Robert Zeidman

TABLE OF CONTENTS

	<u>Page(s)</u>
I. INTRODUCTION.....	1
II. QUALIFICATIONS	1
III. MATERIALS CONSIDERED FOR THIS DECLARATION.....	3
IV. UNDERSTANDING OF LEGAL PRINCIPLES	3
V. BACKGROUND OF THE PATENTED TECHNOLOGIES.....	4
A. THE '100 PATENT.....	4
B. THE '597 PATENT.....	6
C. THE '890 PATENT.....	7
VI. LEVEL OF ORDINARY SKILL IN THE ART	7
VII. DISPUTED TERMS	8
A. “evaluate one or more parameters” (’100 patent, claim 1) / “evaluating ... one or more parameters relating to the operation of the said ventilation system” (’100 patent, claim 9)	8
B. “the predicted rate of change” (’597 patent, claim 9)	12
C. “protect the compressor from rapid cycling” (’890 Patent, claim 1)	13
D. “performance characteristic” (’890 Patent, claim 17)	16

I. INTRODUCTION

1. I have been retained as an expert in the above-captioned case by counsel for EcoFactor, Inc. (“EcoFactor”). I understand that the parties dispute the meaning of certain claim terms. I have studied the intrinsic and relevant extrinsic evidence pertaining to those terms. In this declaration, I provide my opinions regarding how one of ordinary skill in the relevant art would understand each term.

II. QUALIFICATIONS

2. I am an engineer and the founder and president of Zeidman Consulting, which provides engineering consulting to high-tech companies. Among the types of services I provide are hardware and software design. My clients have included Fortune 500 computer and technology companies as well as smaller companies and startups. A copy of my resume is attached hereto as Exhibit 1.

3. I hold a master’s degree from Stanford University in Electrical Engineering and two bachelor’s degrees from Cornell University, one in Electrical Engineering and one in Physics.

4. I have been a computer software and hardware designer for over 40 years, having designed and developed a variety of computer hardware and software. The software products include Internet-based training courses and web-based course administration software, an operating system synthesis tool, a source code comparison tool, a network emulation software bridge, and a remote backup system. I have founded several companies including Zeidman Consulting, a hardware and software development firm, eVault, a remote backup company, the Chalkboard Network, an e-learning company, Zeidman Technologies that develops software tools for enabling and improving hardware and software development, Software Analysis and Forensic Engineering Corporation that develops software forensic analysis tools, Good Beat Poker, an online interactive gaming company.

5. For several decades, I have been designing, writing about, and teaching about

embedded systems that comprise controllers like the ones described in the patents at issue in this matter. For many years, I taught courses on embedded systems at the Embedded Systems conferences throughout the world. I have designed hardware and software for these kinds of controllers into devices at Apple, Cisco, and Ricoh, among others. I was the founder of Zeidman Technologies that created tools for Internet of Things (IoT) devices to control and monitor signals and communicate with the Internet. Zeidman Technologies was named one of the 2016 “Cool Vendors in IoT ‘Thingification’” (<https://www.gartner.com/doc/3311335/cool-vendors-iot-thingification>;) by Gartner. Zeidman Technologies had a contract to develop energy monitoring devices in partnership with CURB (<https://energycurb.com>) for use and resale by Schneider Electric.

6. I have written a variety of papers, books, and presentations on computer hardware and software and other engineering subjects. I am the developer of the Universal Design Methodology, a process for efficiently developing reliable systems, about which I have written extensively.

7. I hold 23 patents in the areas of software analysis, software comparison, software synthesis, hardware emulation, hardware synthesis, hardware simulation, and media broadcast and advertising. I wrote a textbook on software forensics entitled The Software IP Detective’s Handbook, Measurement, Comparison, and Infringement Detection, which is recognized as the seminal book in the field. I have created a tool called CodeSuite for assisting in the determination of whether one computer program has been copied from another computer program.

8. I have consulted on over 250 matters involving intellectual property disputes including instances of alleged software copying, trade secret misappropriation, and patent infringement. My work in this capacity has included, among other things, reviewing and analyzing software source code, reviewing and analyzing patents, reverse engineering hardware and software, writing expert reports, and testifying in court. I have testified at deposition and at trial in a number of these cases, including in other cases involving EcoFactor patents and subject

matter technically similar to the subject matter here. The specific cases can be found in my resume, attached as Exhibit A.

III. MATERIALS CONSIDERED FOR THIS DECLARATION

9. In forming my opinion, I have reviewed, considered, and/or had access to the patent specifications and claims, their prosecution histories, the parties' preliminary claim construction disclosures and extrinsic evidence, and the materials cited in this declaration. I have also relied on my professional experience. I reserve the right to consider additional documents as I become aware of them and to revise my opinions accordingly.

IV. UNDERSTANDING OF LEGAL PRINCIPLES

10. I understand that a claim construction inquiry begins and ends in all cases with the actual words of the claim. Apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular terms. I further understand that the context in which a term is used in the asserted claim can be highly instructive. The patent specification can also shed light on the meaning of claim terms.

11. I understand that, when conducting a claim construction inquiry, courts are not required to construe every limitation present in a patent's asserted claims. I further understand that where a term is used in accordance with its plain meaning, the court should not re-characterize it using different language.

12. I understand that there is a "heavy presumption" that claim terms carry their full ordinary and customary meaning unless the accused infringer can show that the patentee expressly relinquished claim scope. The ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art at the time of the invention. Thus, the task of comprehending the claims often involves little more than the application of the widely accepted meaning of commonly understood words.

13. I understand that without clear and unambiguous disclaimer, courts do not import limitations into claims from examples or embodiments appearing only in a patent's written

description, even when a specification describes very specific embodiments of the invention or even only a single embodiment. Similarly, statements during patent prosecution do not limit the claims unless the statement is a clear and unambiguous disavowal of claim scope.

14. I understand that Respondents bear the burden of proving that a claim is indefinite by clear and convincing evidence. I understand that a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.

V. BACKGROUND OF THE PATENTED TECHNOLOGIES

15. The four asserted patents are U.S. Patent Nos. 8,740,100 (the “’100 patent”); 8,751,186 (the “’186 patent”); 9,194,597 (the “’597 patent”); and 10,584,890 (the “’890 patent”). Because there are no claim construction disputes regarding the ’186 patent, I do not address that patent in this declaration.

A. THE ’100 PATENT

16. The ’100 patent is entitled “System, Method and Apparatus for Dynamically Variable Compressor Delay in Thermostat to Reduce Energy Consumption” and claims priority to a provisional patent application filed on May 11, 2009. Dr. Auslander asserts without any analysis that a different priority date may apply. Auslander Decl. ¶25. In any event, which of these priority dates is controlling would not affect the outcome of my analysis described here.

17. The ’100 patent describes a number of challenges addressed by the claimed invention. For example, the patent explains the use of compressor delays and problems associated with prior art approaches:

As this effect became better understood and was designed into thermostats, it became a standard design feature. The hysteresis band or dead zone is now commonly designed to hold the desired setpoint within a range of ± 1 degree Fahrenheit. So, for example, if the heating setpoint is 68 degrees F., the furnace will turn on when the inside temperature as sensed by the thermostat falls to 67 degrees F., and will turn off again when the inside temperature as sensed by the thermostat reaches 69 degrees F. Thus the inside temperature is allowed to oscillate within a range of two degrees F.

When residential refrigerant-based air conditioners became widely available in the 1950s, the same kinds of thermostats were used to control them as well. The need for a means to preventing rapid cycling is even more important for refrigerant-based systems is even more critical because there is a risk of significant physical damage to a compressor if it is turned on too soon after being turned off—if the refrigerant inside the compressor is still in liquid (and thus incompressible) form when the compressor restarts, expensive mechanical failures are possible.

Electronic thermostats have been available for more than 20 years. Many of these are also programmable. In general, these thermostats no longer use mechanical systems to sense temperature, relying instead on electrical devices such as thermistors or thermal diodes. Switching of the HVAC system is accomplished with solenoids or relays triggered by logic circuits in microprocessors. With such systems, adjustability of the hysteresis band is relatively simple, at least in theory. However, most systems do not allow direct access to this parameter. And the hysteresis band only protects the system against rapid automatic cycling. The hysteresis band will not prevent a user from rapidly changing settings, which can cause the damage discussed above.

The way most electronic systems approach this problem is to enforce, via the electronic circuitry, a compressor delay—that is, whenever the compressor is switched off, the thermostat prevents it from restarting for a set interval, usual in the range of two to five minutes or so. (Some air conditioners may have an additional fail-safe delay in series with any circuitry in the thermostat as well.)

Many programmable thermostats include mechanical switches to allow the installer or user to adjust the compressor delay for the system. But because it is generally expected that the installer of the system will set this parameter once based upon the requirements of the specific air conditioner being controlled, these mechanical switches are generally not accessible to the user from outside the unit. Changing the compressor delay generally requires disassembling the thermostat.

* * *

One specific pattern that has been validated is (in the case of heating) to allow the temperature to drift 2 degrees below the user's chosen setpoint over an extended period of 1-2 hours, and to then revert as quickly as possible to the originally desired setpoint. Because the slow cooling is not easily perceived, but the rapid reheating is, the subjective impression is weighted toward comfort, despite the fact that the average setpoint over the period of the “waveform” is 1 degree lower than the desired setpoint. (The pattern is inverted in the case of air conditioning.)

One approach to achieving the benefits of such a setpoint strategy is to specifically schedule each of the planned setpoint changes required to create such a thermal waveform. This approach requires some combination of significant local intelligence resident in the thermostat, a local computer capable of controlling the thermostat, and/or a remote server managing frequent setpoint changes on remote

devices.

'100 patent at 1:18-3:35.

18. The specification further describes the use of hysteresis bands and compressor delays to prevent rapid cycling of HVAC equipment, including in the context of demand response. See, e.g., '100 patent at 3:61-5:45. The specification also describes the general environment and hardware elements used in embodiments of the inventions. See, e.g., '100 patent at 5:46-8:2, Figs. 1-5. And the specification teaches the graphing of various data used by the claimed inventions (e.g., inside temperature, outside temperature) and the relationship between inside temperature and outside temperature that allows for prediction of rates of change in inside temperature in response to outside temperature. See, e.g., '100 patent at 8:3-38, Figs. 6a, 6B. And finally, the specification describes how compressor delays may be selected for different scenarios, as well as the impacts of such delays. See, e.g., '100 patent at 8:39-9:47, Figs. 7, 8a, 8b, 8c.

B. THE '597 PATENT

19. The '597 patent is entitled "System, Method and Apparatus for Identifying Manual Inputs to and Adaptive Programming of a Thermostat" and claims priority to a provisional patent application filed on May 12, 2009, as well as to another later-filed application. Dr. Auslander asserts without any analysis that a different priority date may apply. Auslander Decl. ¶26. In any event, which of these priority dates is controlling would not affect the outcome of my analysis described here.

20. The '597 patent describes several problems associated with early programmable thermostats, including issues with aligning a user's actual schedule with the schedule they have previously programmed, where a failure to align these two can result in wasted energy usage or reduced comfort. See, e.g., '597 patent at 1:18-2:17. The specification also describes the general environment and hardware elements used in embodiments of the inventions. See, e.g., '597 patent at 2:50-5:4, Figs. 1-5. And the specification teaches the graphing of various data used by

the claimed inventions (e.g., inside temperature, outside temperature) and the relationship between inside temperature and outside temperature that allows for prediction of rates of change in inside temperature in response to outside temperature. See, e.g., '597 patent at 5:5-53, Figs. 6A, 6B. The specification also describes aspects of the patented inventions via several flow diagrams and associated descriptions, including figures relating to detecting and/or incorporating manual changes to setpoints. See, e.g., '597 patent at 5:54-7:43, Figs. 7-9.

C. THE '890 PATENT

21. The '890 patent is entitled “System and Method for Using a Mobile Electronic Device to Optimize an Energy Management System” and claims priority to a non-provisional patent application filed on May 26, 2010, as well as to other later-filed applications. Dr. Auslander asserts without any analysis that a different priority date may apply. Auslander Decl. ¶27. In any event, which of these priority dates is controlling would not affect the outcome of my analysis described here.

22. The '890 patent describes various problems addressed by the claimed invention, including restrictive user interfaces, limited functionality, rapid cycling, and ineffective occupancy sensing. See, e.g., '890 patent at 1:28-3:57. The specification provides extensive disclosure of the patented inventions, spanning over 30 columns of description and several dozen figures. The patent summarizes various embodiments of the invention at a high level (see '890 patent at 3:61-5:17) and provides more detailed descriptions of various aspects of the patented technology (see '890 patent at 6:66-33:6 and associated figures).

23. As particularly relevant to the claim construction disputes here, the specification describes problems associated with rapid cycling (sometimes referred to as “short cycling”) and how the inventions of the '890 patent overcome those challenges. See, e.g., '890 patent at 19:46-20:35, Figs. 20, 21a, 21b, 21c

VI. LEVEL OF ORDINARY SKILL IN THE ART

24. A person of ordinary skill in the art (“POSITA”) at the time of the invention

would have had (1) a bachelor’s degree in engineering, computer science, or a comparable field of study, and (2) at least 2-3 years of professional experience in temperature controls, embedded control systems, electronic thermostats, or HVAC controls, building energy management and controls, or other similarly relevant industry experience. Additional relevant industry experience may compensate for lack of formal education or vice versa. I note that this framework is consistent with what ALJ Elliot found to be the appropriate level of ordinary skill in an ITC investigation involving other EcoFactor patents. See Ex. F (Inv. No. 337-TA-1258, Order No. 18, dated Sept. 1, 2021 (“1258 Markman Order”)) at 7-8. I further note that Dr. Auslander’s proposal (which, among other things, asserts that five years of experience should be required) is essentially the same proposal rejected by ALJ Elliot in the 1258 Investigation. See Auslander Decl. ¶ 24; Ex. F (1258 Markman Order) at 8 (“Professional experience in a more specialized area, even if for a shorter time (as Complainant contends), seems more appropriate than a more general area of experience having no direct connection to the relevant technology, even if for a longer time (as Respondents contend).”).

VII. DISPUTED TERMS

A. “evaluate one or more parameters” (’100 patent, claim 1) / “evaluating ... one or more parameters relating to the operation of the said ventilation system” (’100 patent, claim 9)

EcoFactor’s Proposed Construction	ecobee’s Proposed Construction
No construction necessary; plain and ordinary meaning	Indefinite

25. I agree with EcoFactor’s proposal for this claim term because both “evaluating” claim terms have plain and ordinary meanings that do not require any further construction. I disagree with Dr. Auslander’s assertion that the claims fail to inform a POSITA with reasonable certainty as to the scope of these claim limitations. See Auslander Decl. ¶¶36-40.

26. Dr. Auslander begins by asserting that claims 1 and 9 are indefinite because they “provide absolutely no indication as to what kind of evaluation is to be performed, let alone how

to perform such an evaluation.” Auslander Decl. ¶38. Dr. Auslander further states that the specification “does not inform a POSITA as to how any such evaluation should be performed.” Auslander Decl. ¶39. I disagree and note that at least some of Dr. Auslander’s criticisms appear to be directed to issues of enablement, rather than indefiniteness.

27. The surrounding claim language provides valuable context and clarity as to the scope of the claims. For example, claim 1 recites:

a computer processor in communication with said thermostatic controller, the processor configured to: ...

evaluate one or more parameters including at least the outside temperature measurements and the predicted rate of change, and to determine whether to adopt said first interval or said second interval based upon the values of said parameters.

’100 patent at cl. 1

28. This limitation further clarifies that the rate of change is predicted using stored inside temperature measurements and outside temperature measurements. In other words, the claim language itself indicates which parameters at least are evaluated, how the result of the evaluation is used, and that computer hardware that is configured to perform the evaluation. The same is true for claim 9:

evaluating, with at least one computer processor, one or more parameters relating to the operation of the said ventilation system, wherein the computer processor:

accesses stored data comprising a plurality of internal temperature measurements taken within a structure and a plurality of outside temperature measurements relating to temperatures outside the structure;

uses the stored data to predict a rate of change of temperatures inside the structure in response to at least changes in outside temperatures; and

wherein evaluating the one or more parameters comprises evaluating at least the outside temperature measurements and the predicted rate of change;

determining which of at least a first interval and a second interval is to be enforced as a delay by said thermostatic controller in light of at least the outside temperature measurements and the predicted rate of change, wherein said second interval is longer than said first interval

'100 patent at cl. 9.

29. This is also consistent with the specification, including column 8 and Figure 7, which Dr. Auslander references. See Auslander Decl. ¶39. For example, the specification explains:

FIG. 7 shows a flowchart illustrating the steps required to initiate a compressor delay adjustment event. In step 1102, server 106 retrieves parameters such as weather conditions, the current price per kilowatt-hour of electricity, and the state of the electric grid in terms of supply versus demand for the geographic area that includes a given home. In step 1104 server 106 determines whether to instantiate the compressor delay adjustment program for certain homes in response to those conditions. In step 1106, server 106 determines whether a specific home is subscribed to participate in compressor delay events. If a given home is eligible, then in step 1108 the server retrieves the parameters needed to specify the compressor delay routine. These may include user preferences, such as the weather, time of day and other conditions under which the homeowner has elected to permit hysteresis band changes, the maximum length of compressor delay authorized, etc. In step 1110 the appropriate compressor delay settings are determined, and in step 1112 the chosen settings are communicated to the thermostat.

FIGS. 8(a) through 8(c) illustrate how changes in compressor delay settings affect HVAC cycling behavior by plotting time against temperature. In FIG. 8(a), time is shown on the horizontal axis 1202, and temperature is shown on vertical axis 1204. The setpoint for thermostat 108 is 70 degrees F., which results in the cycling behavior shown for inside temperature 1206. Because compressor delay CD1 1208 is, at approximately 3 minutes, shorter than the natural duration of a compressor off cycle Off1 1210 at approximately 6 minutes for this particular house under the illustrated conditions, the compressor delay has no effect on the operation of the HVAC system. Because the hysteresis band operates so as to maintain the temperature within a range of plus or minus one degree of the setpoint, in the case of air conditioning the air conditioner will switch on when the inside temperature reaches 71 degrees, continue operating until it reaches 69 degrees, then shut off. The system will then remain off until it reaches 71 degrees again, at which time it will switch on. The percentage of time during which inside temperature is above or below the setpoint will depend on conditions and the dynamic signature of the individual, home. Under the conditions illustrated, the average inside temperature AT1 1212 is roughly equal to the setpoint of 70 degrees.

FIG. 8(b) shows how with the same environmental conditions as in FIG. 8(a), the cycling behavior of the inside temperature changes when the compressor delay is longer than the natural compressor off cycle Off1 1210. Extended compressor delay CD2 1214 allows inside temperature 1216 to climb above the range normally enforced by the hysteresis band. Because CD2 is roughly 8 minutes, under the given conditions the inside temperature climbs to approximately 72 degrees before the

compressor delay allows the air conditioner to restart and drive the inside temperature back down. But as before, the air conditioner shuts off when the inside temperature reaches 69 degrees. Thus the average temperature is increased from AT1 1212 to AT2 1218. This change will save energy and reduce cycling because it takes less energy to maintain a higher inside temperature with an air conditioner

FIG. 8(c) shows how the same compressor delay can result in different thermal cycling with different weather conditions. The greater the amount by which outside temperature exceeds inside temperature in the air conditioning context, the more rapidly the inside temperature will increase during an off cycle, and the slower the air conditioner will be able to cool during the on cycle. Thus as compared to FIG. 8(b), when the inside temperature increased to roughly 72 degrees during the extended compressor delay of 8 minutes, a higher outside temperature will cause the inside temperature to increase faster, which results in a peak temperature of roughly 73 degrees, and in wider temperature cycling 1220. The average inside temperature consequently increases from AT(2) 1218 to AT(3) 1222.

'100 patent at 8:39-9:44, Figs. 7, 8a, 8b, 8c.

30. A POSITA would understand the relationship between outside temperature and predicted rate of change, especially given the teachings of the specification. Knowing the outside temperature and the predicted rate of change of inside temperature in response to outside temperature changes allows for the prediction of inside temperature. With this information, a delay interval can be more intelligently selected because factors such as the outside temperature being much hotter or colder than the inside temperature or the predicted rate of change being very high or very low will impact the determination of which delay interval is most appropriate for a given HVAC system. A POSITA would appreciate such considerations and be able to appropriately evaluate relevant factors including at least outside temperature and predicted rate of change. Especially in light of the claims and specification, the scope and meaning of claims 1 and 9 would be reasonably certain to a POSITA.

B. “the predicted rate of change” (’597 patent, claim 9)

EcoFactor’s Proposed Construction	ecobee’s Proposed Construction
“rate of change”: difference between inside temperature measurements divided by the span of time between the measurements Remainder of phrase: No construction necessary; plain and ordinary meaning	Indefinite

31. I agree with EcoFactor’s proposal for this claim term, which is consistent with the parties’ agreed construction for “rate of change” as “difference between inside temperature measurements divided by the span of time between the measurements.” I disagree with Dr. Auslander’s assertion that claim 9 fails to inform a POSITA with reasonable certainty as to the scope of this claim limitation. See Auslander Decl. ¶¶41-45.

32. Dr. Auslander asserts that “a POSITA would not understand what parameter the ‘rate of change’ refers to, over what time period the rate should be calculated or how to calculate the recited predicted rate of change.” Auslander Decl. ¶43. I disagree and note that at least some of these criticisms appear to be directed to issues of enablement, rather than indefiniteness.

33. Both the claims and the specification indicate to a POSITA that “the predicted rate of change” of claim 9 refers to a predicted rate of change of temperatures inside the structure in response to at least changes in outside temperatures. For example, below are two consecutive limitations within claim 9 of the ’597 patent (emphasis added):

9[c] using the stored data to **predict changes in temperatures** inside the structure in response to at least changes in outside temperatures

9[d] calculating scheduled programming of setpoints in the thermostatic controller based on **the predicted rate of change**, the scheduled programming comprising at least a first automated setpoint at a first time and a second automated setpoint at a second time to control the heating ventilation and air conditioning system

34. As claim 9[c] makes clear, the claimed method predicts changes in inside temperature in response to changes in outside temperatures. This relationship (resulting from “in

response to”) can be expressed as a rate of change and graphed as such, which is consistent with claim 9[d] reciting “the predicted rate of change.” Dr. Auslander notes that claim 17 recites “predict a rate of change of temperatures inside the structure” and asserts that this shows the challenged limitation of claim 9 is directed to something different, reasoning that claim 9 otherwise would have used the same words as claim 17. I disagree with Dr. Auslander. Rather than interpret “the predicted rate of change” in a manner that is consistent with claim 9[c] and also claim 17, Dr. Auslander instead jumps to the conclusion that “the predicted rate of change” has no discernible meaning in the context of claim 9[d].

35. EcoFactor’s proposal is also consistent with the specification. For example, the specification explains (emphasis added): “The ability to **predict the rate of change in inside temperature** in a given house under varying conditions may be applied by in effect holding the desired future inside temperature as a constraint and using the ability to **predict the rate of change** to determine when the HVAC system must be turned on in order to reach the desired temperature at the desired time.” ’597 patent at 5:35-40. Dr. Auslander did not identify anything in the specification or prosecution history of the ’597 patent as proposed support for his position.

36. I understand that claims are not considered indefinite merely because they lack an explicit antecedent basis for a given claim term. Instead, I understand that this claim term must be evaluated within the context of the claims, specification, and prosecution history to determine whether it is indefinite. A POSITA would have reasonable certainty as to the scope and meaning of “the predicted rate of change.”

C. “protect the compressor from rapid cycling” (’890 Patent, claim 1)

EcoFactor’s Proposed Construction	ecobee’s Proposed Construction
No construction necessary; plain and ordinary meaning	Indefinite

37. I agree with EcoFactor’s proposal for this claim term. I disagree with Dr. Auslander’s assertion that claim 1 fails to inform a POSITA with reasonable certainty as to the scope of this claim limitation. See Auslander Decl. ¶¶46-51. A POSITA would readily

understand the scope of “protect the compressor from rapid cycling,” particularly given the context of the claims and the specification, and the knowledge of a POSITA.

38. Dr. Auslander contends that claim 1 “provides no guidance on how to determine when cycling is too rapid or how to identify if the compressor is or is not ‘protect[ed]’ from rapid cycling.” Auslander Decl. ¶49. Dr. Auslander’s opinion appears to be that “protect” and “rapid” are terms of degree. I understand that numerical precision is not required for patent claims and that terms of degree are permissible in patent claims.

39. A POSITA would readily understand the terms “protect” and “rapid cycling,” the latter of which is also sometimes referred to as “short cycling.” The specification explains what rapid cycling is, how it can negatively impact the HVAC system and use energy inefficiently, and how thermostats commonly use a “hysteresis zone” or “dead zone” around a customer’s temperature setpoint to help protect against rapid cycling (emphasis added):

Because most thermostats control HVAC systems that do not offer infinitely variable output, traditional thermostats are designed to permit the temperature as seen by the thermostat to vary above and below the setpoint to *prevent the HVAC system from constantly and rapidly cycling on and off*, which is inefficient and harmful to the HVAC system. The temperature range in which the thermostat allows the controlled environment to drift is known as both the *dead zone* and, more formally, the *hysteresis zone*. The hysteresis zone is *frequently set at +/-1 degree Fahrenheit*. Thus if the setpoint is 68 degrees, in the heating context the thermostat will allow the inside temperature to fall to 67 degrees before turning the heating system on, and will allow it to rise to 69 degrees before turning it off again.

’890 patent at 2:5-18.

40. For any given home and HVAC system, the inside temperature will generally change after the HVAC system cycles off, particularly if there is a significant difference between the inside temperature and outside temperature. How long it will take for the temperature change from, for example, 68° F to 69° F after the air conditioning cycles off is impacted by the outside temperature. For example, the inside temperature might increase by one degree more quickly after the AC cycles off if it is 95° F outside than if it is only 73° F outside:

The greater the amount by which outside temperature exceeds inside temperature

in the air conditioning context, the more rapidly the inside temperature will increase during an off cycle, and the slower the air conditioner will be able to cool during the on cycle.

'890 patent at 20:24-28.

41. As described in the specification and as further discussed above, HVAC systems can also impose a compressor delay, including with a hysteresis zone. See, e.g., '890 patent at 19:21-20:38.

42. The specification also provides a series of examples in which compressor delays of varying lengths are provided to protect against rapid cycling. For example, the specification describes a compressor delay of three minutes with respect to Figure 21a and a delay of eight minutes with respect to Figures 21B and 21C. See, e.g., '890 patent at 19:46-20:35, Figs. 20, 21A, 21B, 21C. Claim 1 is not limited to any specific number of minutes that would constitute a "rapid cycling," though disclosures such as these in the specification indicate what generally may be considered a rapid cycle for a given HVAC system.

43. I also note that terms like "rapid cycling" and "short cycling" are commonly used in the field of HVAC control, including with variations of the word "protect" (and similar terms like "prevent" and "reduce"). For example, smart thermostat providers like ecobee and Google use such terminology in their patents and on their websites. See, e.g., Ex. A ¶88 (ecobee patent application stating (emphasis added): "In practice, using a larger humidex value will **reduce the short-cycling** of HVAC system 20, which is harder on the equipment and is generally less efficient heating and cooling."); Ex. B at 4, 5, 6 (ecobee webpage stating (emphasis added): "This setting **prevents your equipment from short cycling**."; "This setting **prevents your equipment from short cycling** and helps to conserve energy."; "This setting **prevents your compressor from short cycling ...**"); Ex. C at 24:23-27 (Google patent stating (emphasis added): "The maintenance band 1106 may be a form of hysteresis **to prevent the rapid cycling of the HVAC system** as the temperature drifts around the setpoint temperature 1120."); Ex. D at 16:53-59 (Google patent stating (emphasis added): "Although some HVAC components, such as many AC compressors, have a built in "lock out" feature that **prevents rapid cycling**, not all

components have such protection. ... In such cases the delay such as in steps 812 and/or 816 are useful in **preventing rapid cycling of HVAC** components that are otherwise unprotected.”) Ex. E (Google Nest help search results for “short cycling”). Examples such as these further demonstrate that the meaning of “protect the compressor from rapid cycling” would be reasonably certain to a POSITA in the field of the ’890 patent.

D. “performance characteristic” (’890 Patent, claim 17)

EcoFactor’s Proposed Construction	ecobee’s Proposed Construction
No construction necessary; plain and ordinary meaning	Indefinite

44. I agree with EcoFactor’s proposal for this claim term. I disagree with Dr. Auslander’s assertion that claim 17 fails to inform a POSITA with reasonable certainty as to the scope of this claim limitation. See Auslander Decl. ¶¶52-56. A POSITA would readily understand the scope of “performance characteristic,” particularly given the context of the claims and the specification, and the knowledge of a POSITA.

45. Claim 17 states that the claimed “performance characteristic” is “generated based at least in part on a previous operation of the HVAC system.” A POSITA would readily understand that an HVAC system’s function is to change inside temperature, indicating that a “performance characteristic” of an HVAC system relates to its ability to change inside temperature. This is consistent with the surrounding language of claim 17 clarifying that the performance characteristic is based at least in part on prior operation of the HVAC system, which would have involved heating/cooling to change inside temperature. See ’890 patent at cl. 17.

46. An example of such a performance characteristic is the rate of change of inside temperature in response to outside temperature, which includes contributions of the HVAC system’s operation. An “on” rate of change reflects the ability of the HVAC system to change inside temperature over time for given inside and outside temperatures. This is consistent with the surrounding claim language because the ’890 patent describes generating rates of change

based on historical information about how a given HVAC system performed under different circumstances.

47. The specification includes extensive disclosures of predicting the rate of change in inside temperature under varying conditions, which are generated based at least in part on previous operation of the HVAC system. For example, the patent describes (emphasis added):

For example, FIG. 9a shows a graph of inside temperature, outside temperature and HVAC activity for a 24 hour period. When outside temperature 1502 increases, inside temperature 1504 follows, but with some delay because of the thermal mass of the building, unless the air conditioning 1506 operates to counteract this effect. When the air conditioning turns on, the inside temperature stays constant (or rises at a much lower rate or even falls) despite the rising outside temperature. In this example, frequent and heavy use of the air conditioning results in only a very slight temperature increase inside the house of 4 degrees, from 72 to 76 degrees, despite the increase in outside temperature from 80 to 100 degrees.

FIG. 9b shows a graph of the same house on the same day, but assumes that the air conditioning is turned off from noon to 7 PM. As expected, the inside temperature 1504 rises with increasing outside temperatures 1502 for most of that period, reaching 88 degrees at 7 PM. Because server 106 logs the temperature readings from inside each house (whether once per minute or over some other interval), as well as the timing and duration of air conditioning cycles, database 300 will contain a history of the thermal performance of each house.

The performance data will allow the server 106 to calculate an effective thermal mass for each such structure—that is, the rate at which the temperature inside a given building will change in response to changes in outside temperature. Because the server will also log these inputs against other inputs including time of day, humidity, etc., *the server will be able to predict, at any given time on any given day, the rate at which inside temperature should change for given inside and outside temperatures.*

The ability to predict the *rate of change in inside temperature* in a given house under varying conditions may be applied by in effect holding the desired future inside temperature as a constraint and using the ability to predict the rate of change to determine when the HVAC system must be turned on in order to reach the desired temperature at the desired time. The ability of an HVAC system to vary turn-on time in order to achieve a setpoint with minimum energy use may be thought of as Just In Time (JIT) optimization.

48. '890 patent at 12:33-13:6, Figs. 9a, 9b; see also '890 patent at 13:21-15:31, Figs. 11, 12a, 12b, 12c, 12d, 13.

49. Dr. Auslander appears to have simply searched the '890 patent for the specific phrase "performance characteristic" and concluded that because this phrase does not appear in the specification, its meaning cannot be determined. I understand that claim terms need not appear word-for-word in the specification in order to be definite. A POSITA reading the claim language and specification would understand with reasonable certainty the scope and meaning of "performance characteristic," which includes the rate of change of inside temperature in response to outside temperature.

I declare under penalty of perjury that the foregoing is true and correct.

Executed February 1, 2022.

By:  _____

Robert Zeidman

Exhibit 1

Bob Zeidman



10981 Willow Valley Ct
Las Vegas, NV 89135
Tel (650) 741-5809
Email Bob@ZeidmanConsulting.com
Website www.ZeidmanConsulting.com

PROFESSIONAL SUMMARY

Bob Zeidman has management experience in the founding and daily operation of various high-tech companies as well as hands-on experience designing, analyzing, and reverse-engineering hardware and software. Mr. Zeidman is considered a pioneer in the fields of analyzing and synthesizing software source code and the creator of the field of Software Forensics. Mr. Zeidman is also considered one of the leading experts in the Verilog hardware description language as well as ASIC and FPGA design. He has written several engineering texts and regularly teaches courses in these areas at conferences throughout the world. Mr. Zeidman is also an experienced and well-regarded expert in intellectual property disputes. Bob is certified in the use of CodeSuite®. He holds a B.A. in Physics and a B.S. in Electrical Engineering from Cornell University and a master's degree in Electrical Engineering from Stanford University.

EXPERIENCE

10/1987 - present: Zeidman Consulting - founder and president

- Provides engineering hardware and software design services to companies.
- Provides engineering support and expert witnesses for high-tech litigation.

8/2007 - present: Software Analysis and Forensic Engineering Corporation - company founder and president

- Software tools for intellectual property litigation.
- Created patented CodeSuite® software including BitMatch®, CodeCLOC®, CodeCross®, CodeDiff®, CodeMatch®, and SourceDetective® for efficiently finding correlation between source code files of different programs.
- Developed CodeSuite-MP for running CodeSuite® on multiple cores of a multicore processor.
- Architected CodeGrid for running CodeSuite® on a supercomputer grid.

8/2020 - present: Good Beat Games - founder and president

- Online gaming company.
- Initially focusing on poker: Good Beat Poker.

12/2013 - present: Firtiva Corporation - founder and president

- Streaming media company.

1/2002 - present: Zeidman Technologies - founder and president

- Software tools for embedded software development.
- Created patented SynthOS® software that automatically synthesizes source code for a real time operating system.
- Created patented Molasses® virtualization software that enables a slow speed hardware emulator or prototype to be attached to a high-speed network to emulate network hardware in a live system.

1/2003 - 4/2008: Semizone.com - advisor

- Web-based training for engineers.
- Advisor on issues relating to e-learning content, development, presentation, and delivery.
- Instructor for various electrical engineering courses.

1/1999 - 12/2002: The Chalkboard Network - founder and president

- Web-based training for engineers and business professionals.
- Developed Depth Control®, a unique instructional design methodology for Web-based training.

1/1997 - 12/1997: Apple Computer - consultant

7/1995 - 9/1995

- Firmware development for a multimedia projection system.
- Firmware development for the Apple Studio Display, an advanced flat panel monitor.

7/1996 - 12/1996: Hitachi Computer Products (America) - consultant

- Helped define an architecture and functional specification for an ATM switch.

10/1995 - 6/1996: Cisco Systems - consultant

3/1995 - 10/1995

10/1994 - 1/1995

- Wrote Verilog behavioral models and developed a Verilog simulation environment for a 10baseT switch.
- Performed schematic capture, Verilog design, and simulation of an FDDI hub.
- Performed schematic capture, Verilog design, and simulation of an ATM router.

5/1997 - 6/1997: Quickturn Design Systems - consultant

3/1995 - 7/1995

1/1994 - 2/1994

5/1993 - 6/1993

- Designed custom memory boards for emulation of a supercomputer.

7/1993 - 3/1994: Adaptive Video - consultant

- Managed a team designing DSP-based medical imaging boards.

1/1993 - 3/1993: Wireless Access - consultant

- Supervised the design of an FPGA-based prototype for a telecommunications encoding and decoding scheme.

1/1992 - 4/1999: eVAULT Remote Backup Service - founder and president

- Invented the concept of remote backup.
- Set up a remote backup system with a central file server and communication lines including ISDN.
- Wrote remote backup software for DOS, Windows, and OS/2 including a GUI, a backup scheduler and file compression, encryption, and communication routines.

6/1991 - 9/1991: STEP Engineering - consultant

- Reviewed and optimized RISC hardware and software.

12/1990 - 8/1991: Ricoh Corporation - consultant

- Led a team that designed four RISC-based controllers for laser printers, scanners, faxes, and copiers.

9/1989 - 11/1990: DAVID Systems - consultant

- Designed network interface boards for 10BaseT, 10Base2, and FOIRL.
- Led an international team that tested an AMI encoding scheme and designed an ASIC for a digital phone set.

5/1993 - 8/1993: Ikos Systems - consultant

8/1992 - 2/1993

3/1988 - 8/1989

- Designed a high speed SBUS to MXIbus interface and a high-speed controller for a parallel processor.
- Architected, designed, and wrote diagnostic software for a RISC-based controller for a simulation accelerator.

10/1987 - 10/1988: Stanford University - consultant

- Led a team of graduate students under Professor Mike Flynn in the design and testing of a neural network memory.

1/1986 - 3/1988: Telestream Corporation - staff engineer

- Developed an architecture model for a telecom parallel processor system.
- Modeled, simulated, and tested a proprietary bus.
- Designed a telecom processing element ASIC.
- Designed a telecom system backplane.

9/1985 - 12/1985: American Supercomputers - staff engineer

- Designed a data cache and the register section logic for a CRAY compatible supercomputer.
- Assisted with the implementation of a behavioral simulator.

1/1985 - 8/1985: ROLM Corporation - staff engineer

- Simulated, debugged, and tested cache and memory control ASICs for a minicomputer.
- Microcoded the character string instructions.

4/1983 - 12/1984: Signetics Corporation - staff engineer

- Project leader for a CMOS DMA Interface chip (68431).
- Simulated a TTL VME bus controller chip (68172).
- Redesigned and simulated an oxide isolated ISL Enhanced Video Attribute Controller chip (2675T).
- Simulated a TTL Disk Phase Locked Loop chip (68459).
- Created a standard procedure for developing ASICs.

LEGAL CONSULTING

8/2019 - present: Knowmadics v. LDX

Law Firm: SKS LAW LLP / Lister-Beaupré

Client: LDX

Court: Ontario Superior Court of Justice, Canada

Case: 7-CV-74995

- Alleged copyright infringement of location monitoring and tracking software
- Compared software code using CodeSuite
- Wrote expert reports
- Testified in deposition

7/2019 - present: Exegy and IP Reservoir v. Activ Financial

Law Firm: Harness, Dickey & Pierce

Client: Exegy

Court: U.S. District Court, Northern District of Illinois

Case: ILND 1:19-cv-02858

- Alleged patent infringement of network devices for real-time financial market data
- Wrote expert declaration for IPR

- Testified in deposition for IPR

7/2019 – 3/2021: Neodron v. Samsung, Microsoft, Amazon, Lenovo, Motorola, Dell, and HP

Law Firm: Russ August & Kabat

Client: Neodron

Court: U.S. International Trade Commission

Case: Inv. No. 337-TA-1162

- Alleged patent infringement of capacitive touch screens
- Wrote expert reports
- Testified in two depositions

6/2019 - 11/2019: iReviewNow & SecurTest v. Datamaxx Applied Technologies

Law Firm: Ausley & McMullen,

Client: iReviewNow & SecurTest

Venue: American Arbitration Association

Case: 01-18-0004-6193

- Alleged breach of contract and trade secret theft of a system for verifying and authenticating background reports and consumer records
- Wrote a declaration and an expert report
- Testified at arbitration hearing

5/2019 – 5/2020: ECI Software Solutions. v. John Plyler Plumbing and Hardware, Olshan Lumber Company, Prosperity Computer Solutions, Greg Matatall, Wade Frazier, and Ed Baldrige

Law Firm: Lewis Brisbois Bisgaard & Smith LLP

Client: Prosperity Computer Solutions

Court: U.S. District Court, Northern District of Texas

Case: 3:18-cv-02758-S

- Alleged copyright infringement and trade secret theft of enterprise resource planning software
- Wrote expert report
- Testified in deposition

10/2018 – 2/2020: Automotive Data Solutions v. Directed Electronics Canada

Law Firm: Trojan Law Offices

Client: Automotive Data Solutions

Court: U.S. District Court, Central District of California

Case: 2:18-cv-01560-GW-E

- Alleged copyright infringement of aftermarket automobile remote starter devices
- Alleged trade secret misappropriation of aftermarket automobile remote starter devices
- Compared software code using CodeSuite
- Wrote expert reports
- Testified in deposition

6/2018 - 3/2019: Sarine Technologies v. Diyora & Bhandari, et al.

Client: neutral expert appointed by the court

Court: Commercial Court at Vadodara, Gujarat, India

Case: Commercial Trademark Suit No. 8 of 2017

- Alleged copyright infringement of diamond imaging software
- Compared code using CodeSuite
- Wrote an expert report
- Affirmed as an expert by the Supreme Court of India

4/2018 – 06/2020: Home Semiconductors v. Samsung Electronics

Law Firm: TechKnowledge Law Group

Client: Home Semiconductors

Court: United States District Court, District of Delaware

Case: Civil Action 13-2033-RGA

- Alleged patent infringement of memory hardware
- Performed research
- Prepared expert report

4/2018 - 5/2018: The State of Missouri v. Eric Greitens

Law Firm: St. Louis Circuit Attorney's Office

Client: The State of Missouri

Court: 22nd Circuit Court, Missouri

Case: Cause No. 1822-CR00642

- Alleged criminal privacy violation
- Researched, analyzed, and compared smartphone camera shutter sounds
- Researched smartphone mechanism for transmission of pictures
- Wrote expert reports
- Testified in deposition

1/2018 - 9/2019: Video Gaming Technologies v. Castle Hill Studio, et al

Law Firm: Saul Ewing Arnstein & Lehr LLP

Client: Castle Hill Studios

Court: U.S. District Court, Northern District of Oklahoma

Case: 17-cv-454-GKF-JF

- Alleged trade secret misappropriation of Class II gaming software
- Compared software code using CodeSuite
- Wrote an expert report
- Testified in deposition

12/2017 - 9/2018: U.S. Ex Rel Maria Uchtyl v. Avanade, et al.

Law Firm: Lowe Graham Jones PLLC

Client: Maria Uchtyl

Court: U.S. District Court, Western District of Washington

Case: C12-2091-JCC

- Alleged fraudulent procurement of government contracts for computer software
- Compared software code using CodeSuite
- Wrote expert report
- Testified in deposition

1/2017 - present: CamSoft Data Systems v. Southern Electronics Supply Company, et al.

Law Firm: Melancon Rimes

Client: CamSoft Data Systems

Court: 19th Judicial District Court, Parish of East Baton Rouge, State of Louisiana

Case: Docket No. 582,741

- Alleged trade secret misappropriation of wireless network configuration technology
- Wrote an expert report
- Testified in deposition

12/2016 - 11/2018: Papst Licensing v. Apple, LG Electronics, ZTE Corporation, Samsung Electronics, Lenovo, Motorola Mobility, and Huawei Technologies

Law Firm: DiNovo Price Ellwanger

Client: Papst Licensing

Court: U.S. District Court, Eastern District of Texas, Tyler Division

Case: Civil Action No. 6:15-cv-1095

- Alleged patent infringement of mobile phones
- Read patents

- Examined mobile phones
- Analyzed software source code
- Wrote expert reports
- Testified in 6 depositions
- Testified at trial

9/2016 - 9/2017: CSS v. Christopher Herrington, Gene Yoho and Compiled Technologies

Law Firm: Robinson & McElwee

Client: Christopher Herrington, Gene Yoho and Compiled Technologies

Court: U.S. District Court, Southern District of West Virginia, Charleston Division

Case: Civil Action 2:16-cv-01762

- Alleged copyright infringement of government document management software
- Alleged trade secret misappropriation of government document management software
- Compared software code using CodeSuite
- Wrote an expert report
- Testified in two depositions

7/2016 - 1/2017: Commonwealth of MA v. Figueroa, et al.

Law Firm: Committee for Public Counsel Services

Client: Figueroa, et al.

Court: Massachusetts District Court and Boston Municipal Court

Case: 1248CR1075

- Supervised a team of engineers analyzing and testing Draeger Alcotest breathalyzer hardware and firmware for accuracy, consistency, and reliability.

5/2016 - 2/2020: In re Papst Licensing GmbH & Co. KG Patent Litigation

Law Firm: Desmarais

Client: Papst Licensing GmbH & Co. KG

Court: U.S. District Court, District of Columbia

Case: Miscellaneous Action No. 07-493-RMC

- Alleged patent infringement of camera interface software
- Read patents and proposed a claim construction
- Wrote a declaration
- Testified in deposition
- Testified at Markman hearing

1/2016 - 6/2016: Verasonics v. Alpinion Medical Systems

Law Firm: Davis Wright Tremaine

Client: Verasonics

Venue: American Arbitration Association, International Centre for Dispute Resolution

Case: 01-15-0002-9484

- Alleged trade secret theft of software for an ultrasound research platform
- Compared software code using CodeSuite
- Wrote a declaration and an expert report
- Testified at arbitration hearing

12/2015 - 2/2017: ACI Worldwide v. MasterCard Technologies

Law Firms: Faegre Baker Daniels / Robins Kaplan

Client: ACI Worldwide

Venue: U.S. District Court, District of Nebraska

Case: 8:14cv-00031

- Alleged trade secret theft of financial transaction middleware
- Compared software code using CodeSuite
- Wrote declarations and expert reports

- Testified at depositions

10/2015 - 6/2017: Phoenix Technologies v. VMware

Law Firm: Cooley

Client: Phoenix Technologies

Venue: U.S. District Court, Northern District of California, Oakland Division

Case: 5:15-cv-01414

- Alleged copyright infringement of BIOS code
- Compared software code using CodeSuite
- Wrote two expert reports
- Testified at deposition
- Testified at trial

7/2015 - 5/2016: Oracle America v. Google

Law Firm: Orrick, Herrington & Sutcliffe

Client: Oracle America

Court: U.S. District Court, Northern District of California

Case: C 10-03561 WHA

- Software copyright infringement of Java API packages
- Wrote expert report
- Testified in deposition

2/2015 - present: Intellisoft v. Acer America

Law Firm: Balaban & Spielberger

Client: Intellisoft

Court: Superior Court of California, County of Santa Clara

Case: 1-14-CV-272381

- Alleged trade secret misappropriation of power management hardware and software
- Examined personal computer hardware and software
- Read patents
- Read industry specifications
- Wrote expert reports
- Testified twice at deposition

2/2015 - 1/2016: NNG v. Ava Enterprises

Law Firm: Lewis Roca Rothgerber Christie LLP

Client: NNG, Kft

Court: U.S. District Court, Central District of California

Case: 2:2014-CV-00220

- Alleged copyright infringement of GPS navigation software
- Wrote expert report

10/2014 - 4/2018: ObjectiVision v. Visionsearch Pty Ltd and University of Sydney

Law Firms: K&L Gates / Marque Lawyers / Allens

Client: ObjectiVision

Court: Federal Court of Australia

Case: NSD 385 of 2014

- Alleged copyright infringement of software for a visual electrophysiology device
- Compared software code using CodeSuite
- Researched algorithms
- Wrote expert reports
- Collaborated in an expert conclave
- Testified in trial

10/2014 - 6/2016: AAMP of America v. Automotive Data Solutions

Law Firm: Trojan Law Offices

Client: Automotive Data Solutions

Court: U.S. District Court, Middle District of Florida, Tampa Division

Case: 8:13-cv-2019-T-35TGW

- Alleged patent infringement of aftermarket stereo interface devices
- Wrote expert reports
- Participated in inter partes review
- Testified in two depositions

11/2013 - 9/2014: United Services Automobile Association v. Mitek Systems

Law Firm: Wilson Sonsini Goodrich & Rosati / Scheper Kim & Harris

Client: Mitek Systems

Court: U.S. District Court, Western District of Texas, San Antonio Division

Case: SA-12-CA-0282-FB

- Alleged trade secret misappropriation of mobile banking and check imaging software
- Alleged patent infringement of mobile banking and check imaging software
- Analyzed software and examined specifications
- Wrote expert reports

6/2013 - 1/2014: Cellebrite Mobile Synchronization v. Micro Systemation

Law Firm: Pearl Cohen Zedek Latzer Baratz LLP

Client: Cellebrite Mobile Synchronization

Court: U.S. District Court, Virginia Eastern District Court, Alexandria Division

Case: 1:13-cv-01014-TSE-TRJ

- Alleged copyright infringement and trade secret misappropriation of mobile device forensic software
- Compared software code using CodeSuite
- Wrote an expert report

4/2013 - 12/2015: Audionics System v. AAMP of Florida

Law Firm: Trojan Law Offices

Client: Audionics System

Court: U.S. District Court, Central District of California, Western Division

Case: 2:12-cv-10763-MMM-JEM

- Alleged patent infringement of aftermarket stereo interface devices
- Wrote expert reports
- Testified in two depositions

2/2013 - 5/2017: Metropolitan Health Corporate v. Neil Harvey Associates

Law Firm: Kritzing & Co / Attorneys Zumpt

Client: Metropolitan Health Corporate

Venue: Western Cape High Court, Cape Town, South Africa

Case: 10264/2010

- Alleged copyright infringement of healthcare administration software
- Compared software code using CodeSuite
- Wrote expert reports

10/2012 - 12/2012: E-Tech USA v. 2lemetry

Law Firm: Reed Smith

Client: 2lemetry

Court: U.S. District Court, District of Colorado

Case: cv-03371-REB-KMT

- Alleged trade secret misappropriation of cloud platform software

- Compared software code using CodeSuite
- Wrote an expert report

8/2012 - 4/2015: Round Rock Research v. SanDisk

Law Firm: Desmarais

Client: Round Rock Research

Court: U.S. District Court, District of Delaware

Case: 12-569 (SLR)

- Alleged patent infringement of flash memory devices
- Analyzed hardware and firmware and examined specifications
- Wrote expert reports
- Testified twice in deposition
- Testified twice in court

8/2012 - 4/2015: SanDisk v. Round Rock Research

Law Firm: Desmarais

Client: Round Rock Research

Court: U.S. District Court, Northern District of California

Case: 1-cv-05243-RS

- Alleged patent infringement of flash memory devices
- Analyzed hardware and firmware and examined specifications
- Wrote expert reports
- Testified in deposition

7/2012 - 5/2013: Kenneth C. Henry v. Petrolink v. Digital Well File

Law Firms: Wright & Close; Martin, Disiere, Jefferson & Wisdom

Client: neutral expert

Court: District Court of Harris County, Texas, 133rd Judicial District

Case: 2010-08178

- Alleged copyright infringement of real-time decision-making software for oilfield data
- Alleged trade secret theft
- Compared software code using CodeSuite
- Wrote two expert reports

7/2012 - 6/2013: Elan Microelectronics v. Pixcir Microelectronics

Law Firm: Alston & Bird LLP

Client: Elan Microelectronics

Court: U.S. District Court, District of Nevada

Case: 2:10-cv-00014-GMN-(PAL)

- Alleged patent infringement of capacitive touch controller hardware and software

1/2012 - 5/2014: Intellectual Ventures v. Altera, Microsemi, Lattice Semiconductor, and Xilinx

Law Firm: Desmarais LLP

Client: Intellectual Ventures

Court: U.S. District Court, District of Delaware

Case: C.A. No. 10-1065-LPS

- Alleged patent infringement of FPGA and ASIC integrated circuits
- Examined schematics and Verilog code
- Wrote expert reports
- Testified at two depositions

1/2012 - 6/2014: ThinkOptics v. Nintendo of America, et al.

Law Firm: Nix Patterson & Roach LLP

Client: ThinkOptics

Court: U.S. District Court, Eastern District of Texas, Tyler Division

Case: 6:2011cv00454

- Alleged patent infringement of video game controller hardware
- Wrote expert reports
- Testified at two depositions

1/2012 - 9/2012: E-Micro Corporation v. Google, et al.

Law Firm: Nix Patterson & Roach LLP

Client: E-Micro

Court: U.S. District Court, Eastern District Of Texas, Tyler Division

Case: 6:11-CV-465 (JDL)

- Alleged patent infringement of mobile commerce software

7/2011 - 12/2011: Facebook v. Power Ventures

Law Firm: Orrick, Herrington & Sutcliffe

Client: Facebook

Court: U.S. District Court, Northern District of California

Case: 5:08-cv-05780 JW (HRL)

- Alleged copyright infringement of social network software
- Alleged trademark infringement of social network software
- Alleged DMCA violation
- Alleged violation of the CAN-SPAM Act
- Alleged violation of the Computer Fraud and Abuse Act ("CFAA")
- Alleged violation of the California Comprehensive Computer Data Access and Fraud Act
- Alleged unfair competition
- Wrote expert report

4/2011 - 4/2014: Motorola Mobility, Google v. Microsoft

Law Firm: Sidley Austin

Client: Microsoft

Court: U.S. District Court, Southern District of Florida

Case: 1:10-cv-2406J-MORENO

- Alleged patent infringement of voicemail software
- Alleged patent infringement of graphics software
- Analyzed patents
- Examined source code
- Wrote expert reports
- Testified in deposition

8/2010 - 3/2011: Cross Match Technologies v. Suprema and Mentalix

Law Firm: Latham & Watkins

Client: Cross Match Technologies

Court: U.S. International Trade Commission

Investigation: 337-TA-720

- Alleged patent infringement of fingerprint scanning and imaging software
- Analyzed patents
- Examined source code
- Compared software code using CodeSuite
- Wrote an expert report
- Testified in deposition

7/2010 - 4/2011: Xpoint Technologies v. Symantec

Law Firm: Quinn Emanuel Urquhart & Sullivan

Client: Symantec

Court: U.S. District Court, District of Delaware

Investigation: 09-CV-0026 (SLR)

- Alleged patent infringement of backup software
- Analyzed patents
- Examined software
- Wrote an expert report

4/2010 - 7/2012: Brocade v. A10 Networks

Law Firms: Orrick, Herrington & Sutcliffe; McDermott, Will & Emery

Client: Brocade

Court: U.S. District Court, Northern District of California, San Jose Division

Case: C 10-03428 LHK (PSG)

- Alleged copying of software for network controllers
- Compared software code using CodeSuite
- Measured software development using CodeCLOC
- Wrote an expert report and several declarations
- Testified in deposition
- Testified at trial

3/2010 - 9/2010: Datamaxx v. Computer Products of Illinois

Law Firm: Ausley & McMullen

Client: Computer Products of Illinois

Court: U.S. District Court, Northern District Of Florida, Tallahassee Division

Case: 4:09cv435-RH/WCS

- Alleged copying of software to enable law enforcement
- Compared software code using CodeSuite
- Wrote a declaration and a rebuttal expert report
- Testified in deposition

2/2010 - 7/2010: SplitFish v. Bannco

Law Firm: Finnegan, Henderson, Farabow, Garrett & Dunner, LLP

Client: SplitFish

Court: U.S. District Court, Northern Eastern District of Virginia, Alexandria Division

Case: 1:10cv297

- Preliminary injunction against defendant granted
- Alleged copying of firmware for video game controllers
- Compared software code using CodeSuite
- Wrote two declarations

12/2009 - 7/2013: Robin Antonick v. Electronic Arts

Law Firm: Kekker & Van Nest LLP

Client: Electronic Arts

Court: U.S. District Court, Northern District of California

Case: 3:11-cv-01543-CRB (EDL)

- Contract dispute
- Examined source code and binary code
- Compared software code using CodeSuite
- Wrote expert reports
- Testified in deposition
- Testified in court

10/2009-11/2009: Sigma Six Technologies and Sigma Six Consulting. v. Nagarro and T-Systems Enterprise Services.

Law firm: Ropers, Majeski, Kohn & Bentley PC

Client: Nagarro

Court: U.S. District Court, Northern District of California

Case: C 08-05633 JW

- Alleged trade secret infringement case involving enterprise client user interface software

8/2009 - 11/2010: Zynga v. Green Patch

Law firm: Quinn Emanuel Urquhart & Sullivan

Client: Zynga

Court: U.S. District Court, Northern District of California

Case: CV-09-3636 SC (EMC)

- Alleged copyright infringement case involving web-based social networking game software
- Compared software code using CodeSuite
- Wrote two declarations and an expert report

8/2009 - 5/2012: De Lage Landen Operational Services v. Third Pillar Systems

Law Firm: Wilson Sonsini Goodrich & Rosati

Client: Third Pillar Systems

Court: U.S. District Court, Eastern District of Pennsylvania

Case: 09-cv-02439-HB

- Alleged trade secret misappropriation and contract dispute involving lending and leasing software
- Compared software code using CodeSuite
- Wrote an expert report and a rebuttal expert report
- Testified in deposition
- Testified at trial

2/2009 - 10/2009: Minden Schipper & Associates v. Cancercare Manitoba (Varian Medical Systems)

Client: Varian Medical Systems

Court: Queen's Bench, Winnipeg Centre, Canada

Case: CI 05-01-45377

- Alleged trade secret misappropriation and copying of oncology diagnosis expert system software.
- Compared software code using CodeSuite
- Wrote an expert report

11/2008 - 1/2010: Applied Materials v. Advanced Micro-Fabrication Equipment Co.

Law firm: Goodwin Procter

Client: Applied Materials

Court: U.S. District Court, Northern District Of California

Case: C07 05248 JW (PVT)

- Alleged copying of software for semiconductor manufacturing machines
- Compared software code using CodeSuite
- Wrote expert reports
- Testified in deposition

9/2008 - 9/2009: Abanco Investments v. GuestLogix

Law firm: Patterson, Thunte, Skaar & Christensen

Client: GuestLogix

Court: U.S. District Court, Northern District of Illinois

Case: 07 C 1071

- Alleged trade secret theft involving point-of-sale software
- Compared software code using CodeSuite
- Wrote an expert report

9/2008 - 3/2010: Personnel Department v. CareerBuilder

Law firm: Jones, Day, Reavis & Pogue

Client: CareerBuilder

Court: U.S. District Court, District of Vermont

Case: 2:08-cv-59-wks

- Alleged trade secret theft involving resume building software
- Compared software code using CodeSuite
- Wrote an expert report

9/2008 - 12/2008: Honeywell, Metrologic, OmniPlanar v. Datalogic

Law firm: Robins, Kaplan, Miller & Ciresi

Client: OmniPlanar

Court: U.S. District Court, District of New Jersey

Case: 1:2008cv05234

- Alleged copyright infringement and trade secret theft involving bar code scanner firmware
- Compared software code using CodeSuite

7/2008-10/2008: Facebook v. StudiVZ

Law firm: Orrick, Herrington & Sutcliffe

Client: Facebook

Court: U.S. District Court, Northern District of California

Case: 5:08-CV-03468 JF

- Alleged copyright infringement case involving web-based social networking software
- Compared software code using CodeSuite

4/2008 - 12/2010: Esbin & Alter v. Zappier, et al.

Law firm: Alter & Alter

Client: Esbin & Alter

Court: U.S. District Court, Southern District of New York

Case: 08 Civ. 313

- Contract dispute case involving billing and document management software
- Compared software code using CodeSuite
- Wrote two declaration and two expert reports

4/2008 - 12/2008: Piper Jaffray v. Vermilion Capital Management

Law firm: Patterson, Thunert, Skaar & Christensen

Client: Vermilion Capital Management

Court: Minnesota District Court, Fourth Judicial District, County of Hennepin

Case: 07-20203

- Alleged trade secret case involving stock market technical analysis software
- Compared software code using CodeSuite
- Wrote an expert report

4/2008 - 11/2008: Intelligraphics v. Marvell Semiconductor

Law firm: Sommers and Schwartz

Client: Intelligraphics

Court: U.S. District Court, Northern District Of California, San Francisco Division

Case: C-07-2499 JCS

- Contract dispute case involving WLAN firmware and drivers
- Compared software code using CodeSuite
- Wrote an expert report
- Testified at deposition

3/2008 - 8/2008: Optovue v. Carl Zeiss Meditec

Law firm: Nixon Peabody

Client: Carl Zeiss Meditec

Court: U.S. District Court, Northern District of California, Oakland Division

Case: C 07-03010 CW

- Alleged copyright/trade secret theft case involving optical coherence tomography software
- Compared software code using CodeSuite
- Wrote an expert report

2/2008 - 4/2008: Gemstar v. Digeo

Law firm: Ropes & Gray

Client: Gemstar

Court: U.S. District Court, Central District of California, Western Division

Case: CV-06-6519

- Alleged patent infringement case involving program guide displays
- Wrote an expert report

1/2008 - 4/2014: MSC Software v. Altair Engineering, et al.

Law firm: Dykema Gossett

Client: MSC Software

Court: U.S. District Court, Eastern District of Michigan, Southern Division

Case: 2:07-cv-12807

- Alleged trade secret theft case involving motion simulation software
- Compared software code using CodeSuite
- Wrote a declaration and an expert report
- Testified at a hearing
- Testified in deposition

5/2007 - 12/2008: The MathWorks v. COMSOL

Law firm: Jones, Day, Reavis & Pogue

Client: The MathWorks, Inc.

Court: U.S. District Court, Eastern District of Texas, Tyler Division

Case: 6:06-CV-335

- Alleged copyright infringement case involving mathematical modeling software
- Compared software code using CodeSuite

5/2007 - 12/2008: The MathWorks v. COMSOL

Law firm: Jones, Day, Reavis & Pogue

Client: The MathWorks, Inc.

Court: U.S. District Court, Eastern District of Texas, Tyler Division

Case: 6:06-CV-334

- Alleged patent infringement case involving mathematical modeling software

5/2007 - 6/2007: Third Party Verification v. SignatureLink

Law firm: Law Offices of Brian S. Steinberger

Client: Third Party Verification

Court: U.S. District Court, Middle District of Florida

Case: 6:06-cv-00415

- Alleged copyright infringement case involving web-based signature capture software
- Compared software code using CodeSuite
- Wrote an expert report

4/2007 - 7/2008: Symantec v. Commissioner of Internal Revenue

Law firm: Baker & McKenzie

Client: Symantec

Court: U.S. Tax Court

Case: 12075-06

- Software transfer pricing tax dispute
- Software comparison using CodeSuite and CLOC methodology

- Wrote an expert report
- Testified at trial

4/2007 - 5/2007: Kernius & Frise v. International Electronics

Law firm: Zito tlp

Client: Kernius & Frise

Case: 05-CV-1927

Court: U.S. District Court, District of Maryland

- Alleged patent infringement case involving modems and call waiting
- Wrote an expert report
- Testified in deposition

2/2007 - 8/2008: Quantum Research Group (Atmel) v. Apple, Cypress, Fingerworks

Law firm: Zito tlp, Sidley Austin

Client: Quantum Research Group (Atmel)

Court: U.S. District Court, District of Maryland

Case: 05-cv-03408-WMN

- Alleged patent infringement case involving capacitive sensing devices
- Assisted with claim construction
- Wrote an expert report
- Testified in deposition

8/2006 - 8/2007: AdTech RFID v. Adept Identification Technologies, et al.

Law firm: Wilson Sonsini Goodrich & Rosati

Client: Adept Identification Technologies

Court: Superior Court of Santa Clara County California

Case: 1:06-CV-057464

- Alleged trade secret theft case involving RFID software
- Compared software code using CodeSuite
- Wrote an expert report

6/2006 - 2/2007: Medinformatix v. AcerMed

Law firm: Timothy McGonigle

Client: MedInformatix

Arbitration: JAMS

Ref: 1220035252

- Alleged trade secret case involving electronic medical records software.
- Assisted with determination of trade secrets
- Compared software code using CodeSuite
- Wrote declarations
- Testified in deposition

5/2006 - 11/2006: Iconix v. NetPickle, et al.

Law firm: Orrick, Herrington & Sutcliffe

Client: NetPickle

Court: U.S. District Court, Northern District of California, Oakland Division

Case: 4:06-cv-02201

- Alleged copyright infringement case involving web-based presentation software
- Compared software code using CodeSuite
- Wrote a declaration
- Wrote an expert report
- Testified in deposition

4/2006 - 10/2006: Forgent v. Microsoft et al.

Law firm: Susman Godfrey

Client: Forgent

Court: U.S. District Court, Northern District of California, San Jose Division

Case: M:05-CV-01654

- Alleged patent infringement case involving JPEG encoding of pictures in files
- Reverse engineered video equipment

2/2006 - 5/2008: Rasterex Holdings v. Research in Motion

Law firm: Kilpatrick Stockton

Client: Rasterex Holdings

Court: Superior Court of Fulton County, State of Georgia

Case: 2003-cv-76785

- Alleged copyright infringement case involving mobile document translation and storage software
- Compared software code using CodeSuite
- Wrote an expert report
- Testified in deposition

2/2006 - 9/2006: Medinformatix v. Camtronics Medical Systems

Law firm: Timothy McGonigle

Client: MedInformatix

Court: U.S. District Court, Central District of California

Case: 2:05-cv-04829 SJO

- Alleged trade secret theft case involving electronic medical records software
- Assisted with determination of trade secrets
- Compared software code using CodeSuite
- Wrote declarations

8/2005 - 12/2007: Moneygram Payment Systems v. Enterprise Payment Solutions

Law firm: Michael Best & Friedrich LLP

Client: Moneygram

Court: U.S. District Court, Eastern District of Tennessee

Case: 1:05-cv-00172

- Alleged copyright infringement case involving ACH financial software
- Compared software code using CodeSuite
- Wrote an expert report

8/2005 - 8/2006: Silvaco v. Specular

Law firm: Wilson Sonsini Goodrich & Rosati

Client: Specular

Court: Superior Court of Santa Clara County California

Case: 1:04-cv-031951

- Alleged trade secret case involving electronic design automation (EDA) software
- Compared software code using CodeSuite
- Wrote an expert report

7/2005-2/2008: ConnectU v. Facebook, et al.

Law firm: Orrick, Herrington & Sutcliffe

Client: Facebook

Court: U.S. District Court, District of Massachusetts

Case: 1:04-cv-11923

- Alleged copyright infringement case involving social network software
- Compared software code using CodeSuite

4/2005 - 3/2007: Merchant Transaction Systems, et al. v. Nelcela, et al.

Law firm: Lewis & Roca

Client: Merchant Transaction Systems/POST Integration/Ebocom

Court: U.S. District Court, District of Arizona

Case: 2:02-cv-01954

- Alleged copyright infringement involving credit card processing software
- Compared software code using CodeSuite
- Wrote an expert report
- Testified in deposition

4/2005: Brod v. Lev, et al.

Law firm: Wilson Sonsini Goodrich & Rosati

Client: Lev

Court: Superior Court of Santa Clara County California

Case: 1:03-cv-005813

- Alleged copyright infringement case involving Internet acceleration software
- Compared software code using CodeSuite

3/2005 - 12/2005: American Video Graphics v. Electronic Arts, et al.

Law firm: McKool Smith

Client: AVG

Court: U.S. District Court, Eastern District of Texas, Tyler Division

Case: 6:04-CV-398

- Alleged patent infringement case involving 3D graphics software algorithms
- Examined source code for over 50 video games
- Wrote claim charts for each video game

3/2005 - 12/2005: American Video Graphics v. Sony Corporation of America, et al.

Law firm: McKool Smith

Client: AVG

Court: U.S. District Court, Eastern District of Texas, Tyler Division

Case: 6:04cv399

- Alleged patent infringement case involving 3D graphics hardware algorithms
- Examined graphic chips

8/2004 - 12/2007: Creative Science Systems v. Forex Capital Markets

Law firm: Baker & McKenzie/Sommers and Schwartz

Client: Creative Science Systems

Court: U.S. District Court, Northern District of California

Case: 5:04-cv-03746

- Alleged copyright infringement involving web-based financial software
- Compared software code using CodeSuite
- Compared software object code
- Wrote a declaration and an expert report
- Testified in deposition

8/2004 - 3/2005: XIOTech v. Compellent Technologies, et al.

Law firm: Faegre & Benson

Client: Compellent

Court: Minnesota District Court, Fourth Judicial District, County of Hennepin

Case: 04-5065

- Alleged trade secret theft involving storage area network (SAN) software
- Compared software code using CodeSuite
- Compared features and researched prior art for storage area network (SAN) software

- Wrote an expert report

8/2004 - 9/2004: OpenTable v. Smart Restaurant Solutions

Law firm: Wilson Sonsini Goodrich & Rosati

Client: Smart Restaurant Solutions

Court: Superior Court of the State of California for the County of San Francisco

Case: CGC-03-424516

- Alleged copyright infringement involving restaurant management software
- Compared software code using CodeSuite
- Wrote an expert report

7/2004 - 2/2005: Zoran and Oak Technology v. MediaTek, et al.

Law firm: Wilson Sonsini Goodrich & Rosati /Hogan & Hartson

Client: MediaTek

Court: U.S. International Trade Commission

Investigation: 337-TA-506

- Alleged patent infringement involving CD-ROM/DVD controller hardware
- Examined VHDL for two CD-ROM/DVD controller chips to determine their architectures and implementations
- Wrote an expert report and created exhibits for trial
- Testified in deposition
- Testified at trial

4/2004 - 11/2004: Agere Systems v. Intersil

Law firm: Kirkland & Ellis

Client: Agere

Court: U.S. District Court, Eastern District of Pennsylvania

Case: 02-CV-08219, 02-CV-1544

- Alleged copyright infringement and contract dispute involving WLAN chips
- Compared firmware source code using CodeSuite
- Examined Verilog and VHDL source code
- Wrote an expert report and rebuttal to opposition expert report

4/2003 - 5/2003: Alvis v. Hewlett-Packard

Law firm: Drinker Biddle & Reath

Client: Hewlett Packard

Court: U.S. District Court, District Court of Jefferson County, Texas

Case: A-164,880

- Class action suit involving reliability of floppy disk drives and software patches
- Wrote an expert report
- Testified in deposition

4/2003 - 5/2003: MediaTek Software Clean Room Development Project

Law firm: MacPherson Kwok

Client: MediaTek

- Clean room code development
- Reviewed source code and compared different source code routines for similarities

3/2003 - 5/2003: Research In Motion v. Good Technology

Law firm: Jones, Day, Reavis & Pogue

Client: Research In Motion

Court: U.S. District Court, District of Delaware

Case: 02-556-JJF, 02-1286-JJF, 02-1338-JJF

- Alleged patent infringement case involving handheld wireless devices and supporting software

- Analyzed software code
- Assisted with deposition of opposing expert
- Wrote claim charts

8/2001 - 9/2001: Intel v. VIA Technologies

Law firm: Howrey Simon Arnold & White

Client: Intel

Court: U.S. District Court, Northern District of California

Case: C99-03062

- Alleged patent infringement case involving computer motherboards
- Examined computer motherboards for patent infringement

7/2001 - 4/2003: Intel v. VIA Technologies

Law firm: Dewey Ballantine/Brobeck, Phleger & Harrison

Client: Intel

Court: U.S. District Court, Western District of Texas

Case: A-01-CA-602-SS

- Alleged patent infringement cases involving CPUs and computer chipsets
- Assisted with claim construction
- Wrote test case software in assembly language
- Examined computer motherboards
- Analyzed Verilog code of CPUs
- Wrote several expert reports
- Wrote several claim charts

3/2001 - 3/2001: KRS Distributing v. Gatten Insurance

Law firm: Stone & Hiles

Client: Gatten Insurance

- Insurance claim
- Examined a fax machine to retrieve stored documents

7/1997 - 3/1999: Texas Instruments v. Hyundai Electronics Industries Co.

Law firm: Jones, Day, Reavis & Pogue

Client: Texas Instruments

Court: U.S. District Court, Eastern District of Texas

Case: 2:98CV74

- Alleged patent infringement involving semiconductor wafer handling hardware, software, and communication protocols
- Reverse engineered hardware and software in order to determine infringement.
- Constructed exhibits
- Assisted with the writing of expert reports
- Assisted with the writing of claim charts

8/1996 - 12/1996: Texas Instruments v. Samsung Electronics, et al.

Law firm: Jones, Day, Reavis & Pogue

Client: Texas Instruments

Court: U.S. District Court, Eastern District of Texas

Case: 2:96-CV-1, 2:96-CV-2

- Alleged patent infringement involving semiconductor wafer handling hardware, software, and communication protocols
- Reverse engineered hardware and software in order to determine infringement
- Constructed exhibits
- Assisted with the writing of expert reports
- Assisted with the writing of claim charts

2/1996 - 7/1996: Cirrus Logic v. Agarwal, et al.

Law firm: Morrison & Foerster

Client: Cirrus Logic

Court: Superior Court of Santa Clara County California

Case: CV 745373

- Alleged trade secret case involving semiconductors and LCD display technology
- Examined validity of trade secrets
- Reconstructed the history of an internal engineering project
- Researched prior art

HONORS, AWARDS, AND DISTINCTIONS

Engineering and Science

1. 2018 CREST (Cupertino Recognizes Extra Steps Taken) Award, Innovator of the Year
2. Outstanding Engineer in a Specialized Field: For Pioneering Contributions to the Field of Forensic Software Analysis, IEEE Region 6 Central Area, 2015.
3. Outstanding Engineer in a Specialized Field: For Pioneering Contributions to the Field of Forensic Software Analysis, IEEE Santa Clara Valley Section, 2015.
4. Final Round, 2011 Jolt Awards, for the book *The Software IP Detective's Handbook: Measurement, Comparison, and Infringement Detection*.
5. Outstanding Engineer in a Specialized Field: For Innovative Contributions in the Area of Forensic Software Analysis, IEEE Santa Clara Valley Section, 2010.
6. Session's Best Paper Award, The 11th World Multi-Conference on Systemics, Cybernetics and Informatics, 2007.
7. The Number 5 Programmable Logic "How To" article of 2006, Programmable Logic DesignLine newsletter.
8. Finalist, Design News magazine 2006 Golden MouseTrap Award: Design and Development Software Tools, for SynthOS.
9. Winner, Software Development magazine 2003 Jolt Reader's Choice Award for the book *Designing with FPGAs and CPLDs*.
10. Senior Member, ACM
11. Senior Member, IEEE
12. Top PLD/FPGA News and Feature Article for 2003, CMP Media
13. Winner, Wyle/EE Times American By Design Contest, 1994
14. Stanford Graduate Engineering Fellowship
15. Eta Kappa Nu (Electrical Engineering honor society)
16. Association for Educational Data Systems Honorable Mention
17. Bausch & Lomb Honorary Science Award

Writing and Filmmaking

1. Indie Excellence 2013 Winner, Humor category, for the novel *Good Intentions*.
2. Indie Excellence 2013 Finalist, Political Thriller category, for the novel *Good Intentions*.
3. Honorable Mention, 2013 San Francisco Book Festival, for the novel *Horror Flick*.
4. Pinnacle Book Achievement Award 2012 for the novel *Good Intentions*.

5. Semifinalist, November 2011 Amazon Studios Best Kids and Family Script Award, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
6. Semifinalist, October 2011 Amazon Studios Best Script Award, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
7. Semifinalist, September 2011 Amazon Studios Best Script Award, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
8. Semifinalist, August 2011 Amazon Studios Best Script Award, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
9. Semifinalist, July 2011 Amazon Studios Best Script Award, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
10. Semifinalist, June 2011 Amazon Studios Best Sci-Fi/Action Script Award, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
11. Semifinalist, June 2011 Amazon Studios Best Script Award, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
12. Semifinalist, 2004 Cinequest Screenwriting Competition, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
13. Second Place, 2002 Autumn Moon Productions Screenplay Awards, for the screenplay "Horror Flick."
14. Third Place, 2002 Autumn Moon Productions Screenplay Awards, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
15. Honorary Mention, 2002 Autumn Moon Productions Screenplay Awards, for the screenplay "Sex and Violence."
16. Certificate of Merit, 2002 International Screenplay Competition, for the screenplay "Horror Flick."
17. Certificate of Merit, 2002 International Screenplay Competition, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
18. Certificate of Merit, 2002 International Screenplay Competition, for the screenplay "Sex and Violence."
19. First Place, 2001 Focus on Writers Contest, for the screenplay "Horror Flick."
20. Special Mention Winner, 2001 Screenwriting Showcase Awards, for the screenplay "Horror Flick."
21. Finalist, 2001 Empyrion Screenplay Competition, for the screenplay "Sex and Violence."
22. Finalist, 2001 New Century Writer Awards, for the screenplay "Horror Flick."
23. Top Ten Finalist, 2001 Tennessee Screenwriting Association Competition, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
24. Semifinalist, 2001 WordsFromHere Contest, for the screenplay "Horror Flick."
25. Semifinalist, 2001 Venice Arts Screenwriting Competition, for the screenplay "Horror Flick."
26. Semifinalist, 2001 National Screenwriting Competition, for the screenplay "Horror Flick."
27. Semifinalist, 2001 National Screenwriting Competition, for the screenplay "Sex and Violence."
28. Quarterfinalist, 2001 Fade In: Screenwriting Awards, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
29. Quarterfinalist, Texas Film Institute 2001 Screenplay Competition, for the screenplay "Horror Flick."

30. Top Finalist, BDR 2000 Productions New Millennium Screenplay 2001 Contest, for the screenplay "Horror Flick."
31. Certificate of Merit, Writer's Digest 2000 National Self-Published Book Awards, for the novel "Horror Flick."
32. Semifinalist, 2000 poetry.com North American Open Poetry Contest, for the poem "I Remember."
33. Quarterfinalist, 1999 New Century Writer Awards, for the novel "Horror Flick."
34. Quarterfinalist, 1999 New Century Writer Awards, for the screenplay "The Amazing Adventure of Edward and Dr. Sprechtmachen."
35. Third Place, 1998 Magnum Opus Discovery Awards of the C.C.S. Entertainment Group and the Hollywood Film Festival, for the novel "Horror Flick."
36. Quarterfinalist, 1998 Empire Screenplay Contest, for the screenplay "Sex and Violence."
37. A reading of my screenplay "Sex and Violence" was performed by the Independent Media Artists Group (IMAGE), on August 15th, 1998.
38. Vermont Studio Center scholarship to attend a one-month writing retreat, April 1998.
39. Semifinalist, 1997 Monterey County Film Contest, for the screenplay "Sex and Violence."
40. First Place, 1993 Foster City Annual Writer's Contest, for unpublished short story "The Contest."
41. Semifinalist, 1993 national Syndicated Fiction Project, for unpublished short story "The Contest."
42. First Place, 1990 Foster City Annual Writer's Contest, for unpublished short story "The Lost and Found Virginity."
43. 1989 Philadelphia International Film Festival showing of the short film "Writer's Block."
44. First Place, 1988 Fremont Film Festival, for the short film "February 20, 1988."

Miscellaneous

1. Albert Nelson Marquis Lifetime Achievement 2018.
2. United Synagogue Award for Excellence
3. Biography in Who's Who in America
4. University Unions Distinguished Service Award
5. Phi Beta Kappa
6. Ivy League Honor Society
7. Alpha Lambda Delta honor society
8. Dual Degree Program, Cornell University
9. National Merit Scholarship
10. Literary Society Foundation Award Gold Medal, Excellence in German
11. Literary Society Foundation Award Bronze Medal, Excellence in German
12. Rumsey Scholarship, Cornell Club of Philadelphia
13. City of Philadelphia Scholarship
14. School District of Philadelphia Scholarship
15. Fourth Prize, Colonial Philadelphia Historical Society Essay Contest

16. Founder, Delaware Valley Teen Mensa

SPECIAL KNOWLEDGE AND SKILLS

- CodeSuite certified.
- Software source code analysis and synthesis
- Computer architectures: AMD 29000, CRAY XMP, Data General MV8000, IBM PC, IDT R4650, Intel 8051, Intel x86 family, Motorola 68000, 68HC11, 68HC08, 68HC05, TI TMS320Cxx, TMS340xx
- Networking protocols: ATM, Ethernet
- Buses: ADB, EISA I²C, ISA, MXI, PCI, SBUS, VME
- Hardware programming languages: ABEL, AHDL, CUPL, PALASM, Verilog, VHDL
- Software programming languages: APL, BASIC, C, C++, Delphi, FOCAL, FORTRAN, Java, LISP, Pascal, Perl, PHP, PL/1, PowerBuilder, SQL, Visual BASIC, various assembly, machine languages
- Operating systems: AOS/VS, MSDOS, UNIX, VMS, Windows 3.1/NT/9x/2000/XP/Vista
- Workstations: Apple Macintosh, Daisy, IBM PC, Hewlett Packard, SUN, VALID
- Electronic Design Automation (EDA)
- CAD tools: Concept, Futurenet, MAX+Plus II (Altera), MDE (LSI Logic), Mentor, Orcad, PROCapture, P-CAD, Schema, Viewlogic, XACT (Xilinx)
- Simulation accelerators: Mentor Graphics, Cadence Design Systems
- Hardware emulators: Mentor Graphics, Cadence Design Systems
- ASIC design
- FPGA and CPLD design: Actel, Altera, Lattice, Xilinx
- Miscellaneous design experience: Cache memory, telecommunications, data communications, digital signal processing (DSP), digital logic (CMOS, ECL, TTL), analog
- Patent infringement
- Trade secret theft
- Copyright infringement
- Plagiarism detection
- Solid state theory
- Information theory

EDUCATION

Master of Science in Electrical Engineering, 1982, Stanford University

Bachelor of Science with distinction in Electrical Engineering, 1981, Cornell University

Bachelor of Arts cum laude in Physics and with distinction in all subjects, 1981, Cornell University

De Anza College Film Department, 1987 - 1990

BOOKS

1. Bob Zeidman, *Just Enough Electronics to Impress Your Friends and Colleagues*, Swiss Creek Publications, Cupertino, CA, 2013, 214pp.
2. Bob Zeidman, *The Software IP Detective's Handbook: Measurement, Comparison, and Infringement Detection*, Prentice-Hall, Upper Saddle River, NJ, 2011, 450pp.
3. Clive Maxfield, *FPGAs: World Class Designs*, Elsevier Inc., Burlington, MA, 2009, Chapter 1 (reprint).
4. Ashby, Baker, Ball, Crowe, Hayes-Gill, Hickman, Kester, Mancini, Grout, Pease, Tooley, Williams, Wilson, Zeidman, *Circuit Design: Know It All*, Elsevier Inc., Burlington, MA, 2008, Chapters 27-29 (reprint).
5. R. C. Cofer, Clive Maxfield, Bob Zeidman, Richard Munden, Rick Gentile, *Newnes FPGAs: Ebook Collection*, Elsevier Science & Technology Books, Burlington, MA, 2008 (reprint).

6. Bob Zeidman, *Designing with FPGAs and CPLDs*, CMP Books, Lawrence, KS, 2002, 220pp.
7. Bob Zeidman, *Introduction to Verilog*, IEEE Press, Piscataway, NJ, 2000, 99pp.
8. Bob Zeidman, *Verilog Designer's Library*, Prentice-Hall, Upper Saddle River, NJ, 1999, 411pp.
9. Bob Zeidman, *Good Intentions*, Swiss Creek Publications, Cupertino, CA, 2012, 259pp.
10. Bob Zeidman, *Horror Flick*, Swiss Creek Publications, Cupertino, CA, 1999, 341pp.
11. Bob Zeidman, *The Amazing Adventure of Edward and Dr. Sprechtmachen*, Swiss Creek Publications, Cupertino, CA, 1998, 73pp.

PAPERS AND PRESENTATIONS

1. Zeidman, Bob, "Clarifying the U.S. Approach to Copyright and Plagiarism," *IPWatchdog* (<https://www.ipwatchdog.com/2019/08/06/clarifying-u-s-approach-copyright-plagiarism>), August 6, 2019.
2. Zeidman, Bob, "The History of Digital Game Intellectual Property from Atari to Zynga," Vintage Computer Festival West, August 5, 2018.
3. Zeidman, Bob, "Oracle v. Google: Protecting Software Development, Not Destroying It," *IPWatchdog* (<http://www.ipwatchdog.com/2018/07/15/oracle-v-google-protecting-software-development/id=99359>), July 16, 2018.
4. Zeidman, Bob, "RPost Does Not Meet Any Definition of 'Patent Troll,'" *IPWatchdog*, (<http://www.ipwatchdog.com/2017/12/05/rpost-not-patent-troll/id=90783>), December 5, 2017.
5. Zeidman, Robert, et al., In The Supreme Court of the United States, Brief of a Group of Inventors, Entrepreneurs, and Small Business Owners as Amici Curiae in Support of Petitioner, RPost Communications Limited, RMail Limited, RPost International Limited And RPost Holdings Incorporated, Petitioners, V. GoDaddy.com LLC Respondent, No. 17-695, December 1, 2017.
6. Zeidman, Bob, "Was MS-DOS code copied from CP/M?" Vintage Computer Festival West, August 6, 2016.
7. Zeidman, Bob, "Facebook, Oculus, ZeniMax, and Nonliteral Copying of Code" *IPWatchdog* (<http://www.ipwatchdog.com/2017/02/07/facebook-oculus-zenimax-nonliteral-copying-code>), February 7, 2016.
8. Zeidman, Bob, "What If Someone Steals Your Code?" Better Software, Fall 2016.
9. Zeidman, Bob, "Source Code Comparison of DOS and CP/M," Journal of Computer and Communications (<http://www.scirp.org/journal/PaperInformation.aspx?PaperID=71259>), Vol.4 No.12, October 2016.
10. Zeidman, Bob, "Was DOS copied from CP/M?" *Embedded.com* (<http://www.embedded.com/electronics-blogs/say-what-/4442498/Was-DOS-copied-from-CPM->), August 6, 2016.
11. Zeidman, Bob, "Software, Hard Case," *Legaltech News* (http://www.lawtechnews-digital.com/lawtechnews/august_2016?sub_id=4m2w4egd99X&folio=30&pg=30#pg30), August 2016.
12. Zeidman, Bob and Gupta, Eashan, "Why Libertarians Should Support a Strong Patent System" *IP Frontline* (<http://ipfrontline.com/2016/03/why-libertarians-should-support-a-strong-patent-system>), March 15, 2016.
13. Zeidman, Bob, "Not Getting the Truth about the FBI, Apple, the San Bernardino Terrorists, and Hacking an iPhone" *IPWatchdog* (<http://www.ipwatchdog.com/2016/02/22/youre-not-hearing-the-truth-about-the-fbi-apple-the-san-bernardino-terrorists-and-hacking-an-iphone>), February 22, 2016.

14. Zeidman, Bob, "Drawing Accurate Forensic Conclusions," *Digital Forensics*, Issue 26 (<https://zeidmanconsulting.com/documents/Drawing%20Accurate%20Forensic%20Conclusions%20-%20Digital%20Forensics%20magazine%20-%20Feb%20%202016.pdf>), February 2016.
15. Zeidman, Bob and Gupta, Eashan, "Why Libertarians Should Support a Strong Patent System" *IPWatchdog* (<http://www.ipwatchdog.com/2016/01/05/why-libertarians-should-support-a-strong-patent-system>), January 5, 2016.
16. Zeidman, Bob, "The Anti-Marcus Lemonis Principle for Succeeding In Business," *RealClearMarkets* (http://www.realclearmarkets.com/articles/2015/12/02/the_anti-marcus_lemonis_principle_for_succeeding_in_business_101899.html), December 2, 2015.
17. Zeidman, Bob, "An Overview of Software Forensics," *IP Frontline* (<http://ipfrontline.com/2015/10/an-overview-of-software-forensics>), October 27, 2015.
18. Zeidman, Bob, "RISC needs to make a comeback," *Embedded Computing Design*, (<http://embedded-computing.com/guest-blogs/risc-needs-to-make-a-comeback>), September 15, 2015.
19. Zeidman, Bob, "Are wearables wearing thin?" *IT World*, (<http://www.itworld.com/article/2979834/internet-of-things/are-wearables-wearing-thin.html>), September 3, 2015.
20. Zeidman, Bob, "An inventor's perspective on patent reform" *The Hill* (<http://thehill.com/blogs/congress-blog/technology/250593-an-inventors-perspective-on-patent-reform>), August 10, 2015.
21. Zeidman, Bob, "How much does your thermostat know about you?" *IT World*, (<http://www.itworld.com/article/2952744/internet-of-things/how-much-does-your-thermostat-know-about-you.html>), July 30, 2015.
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Named inventor on following patents and patent applications:

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TRAINING/TEACHING EXPERIENCE

Presented seminars and courses on the following topics:

- Analysis of Software Copyright Infringement Cases
- A Crash Course in Verilog
- All About Patents
- ASIC Design
- All About Electronics
- Choosing an OS for your IoT device
- CPLD Design
- Creating a Multitasking System at the Push of a Button Using SynthOS
- Detecting Software IP Theft
- Electrical Engineering for non-EEs
- Finding and Utilizing Technical Consultants for IP Litigation
- FPGA Design
- FPGAs vs. ASICs for Networking
- The History of Digital Hardware Design
- How to Start a Consulting Business
- Introduction to Programmable Systems on a Chip
- Investigating Technology Theft
- Measuring Software Changes with the CLOC Method
- Memory Architectures
- Patent Litigation Tips
- Patents
- Programmable Systems on a Chip (SOCs)

- Protecting Your Intellectual Property
- Push-Button Creation of an Optimized Application Specific OS
- Real-Time Operating Systems for SOCs
- Software Copyright Infringement Allegations - Inside the Forensic Analysis
- Software Intellectual Property
- Software Synthesis
- Software Synthesis for Embedded Systems
- Starting a Consulting Business
- Technical Consultants for IP Litigation
- Testing Memory
- Understanding Innovation
- Universal Design Methodology
- Verilog and HDLs
- What I Did Right And What I Screwed Up - Lessons From A Parallel Entrepreneur
- You Invented It, Now Protect It!

At the following places:

- Association of Computing Machinery, Bay Area
- Cogswell College
- College of San Mateo
- Cornell Entrepreneur Network
- Design Automation Conference
- DesignCon
- Eastcon
- Easy Paths to Silicon Design
- Embedded Systems Conference
 - Boston
 - Chicago
 - Europe
 - India
 - London
 - Minneapolis
 - Silicon Valley
- Embedded TechCon
- Forensic Expert Witness Association National Conference
- Gigabit Ethernet Conference
- High-Level Electronic System Design Conference
- High Technology Crime Investigation Association
- Institute of Electrical and Electronics Engineers
- IoT Evolution Expo
- LancerHacks
- Maker Faire
- Microsoft Store, Stanford Shopping Center
- Midwest IP Institute
- NALSAR University of Law
- Network Processors Conference West
- Northcon
- Opportunity X
- Palo Alto Area Bar Association
- PCB Design East
- PCB Design West
- San Jose State University

- San Francisco State University
- Semizone.com
- Server Blade Summit
- Silicon Valley Code Camp
- Southcon
- Stanford University
- Vintage Computer Festival
- Westcon
- World Intellectual Property Technical Forum